

S.5 AGRICULTURE SCENARIO-BASED TASKS

Based on Diocese of West Ankole Harmonised Topics for S.5 Promotional Examinations (2025)

1. Cells and Cell Physiology

Scenario 1: Root Cell Function A student conducted an experiment to observe water absorption in onion root cells by placing root tips in different salt concentrations. Some cells became flaccid while others remained turgid. Task: Explain how osmosis influenced the observed results. Discuss how such cell behavior relates to water uptake in plant roots under different soil conditions.

Scenario 2: Active Transport in Plants A farmer applies fertilizer to maize plants, expecting rapid growth. However, the soil pH is highly acidic, and the plants show poor nutrient uptake despite adequate watering. Task: Explain how active transport operates in root cells and discuss how soil pH affects the absorption of mineral ions by plants.

2. Biochemical Compounds in Cells

Scenario 1: Enzyme Activity and Temperature During a biology practical, a student tested the activity of the enzyme catalase on hydrogen peroxide at different temperatures. The reaction was vigorous at 35°C but stopped at 80°C. Task: Explain how temperature affects enzyme activity in living cells and discuss the importance of enzymes in plant and animal metabolism.

Scenario 2: Energy in Cellular Processes A dairy farmer notices that cows on a low-carbohydrate diet show reduced milk yield and lethargy. A vet explains this is due to insufficient cellular energy. Task: Describe how carbohydrates are metabolized to release energy and explain how this energy supports vital body processes in livestock.

3. Transmission Genetics and Genetic Engineering

Scenario 1: Breeding for Resistance A bean farmer in Bushenyi notices that some plants in her garden survive anthracnose disease while others die. She decides to collect seeds only from the resistant plants for the next season. Task: Explain the genetic principle behind her selection method and discuss how selective breeding contributes to developing disease-resistant crop varieties.

Scenario 2: Genetically Modified Crops Researchers at Makerere University develop a maize variety modified with a bacterial gene for insect resistance. Some farmers adopt it, while others express concerns about safety and seed dependence. Task: Analyze how genetic engineering is used to develop such crops. Discuss both the benefits and risks of adopting genetically modified organisms (GMOs) in Uganda's agriculture.

4. Animal Anatomy, Morphology, and Physiology

Scenario 1: Digestive Adaptation A farmer keeps both rabbits and goats. He observes that rabbits feed on soft grasses and also eat their droppings, while goats browse on leaves and twigs. Task: Compare the digestive systems of the two animals and explain how their anatomical differences

support their feeding habits.

Scenario 2: Circulatory System and Exercise During training, a student observes that a bull used for ploughing breathes faster and sweats after long hours of work. Task: Explain the physiological changes that occur in the circulatory and respiratory systems during exercise and how they help maintain body function.

5. Livestock Management and Rearing Practices

Scenario 1: Dairy Herd Improvement A dairy farmer records low milk yield despite having high-breed cows. Investigation shows poor housing ventilation and irregular feeding times. Task: Identify and discuss the management factors affecting milk production. Suggest practical measures to improve milk yield and animal welfare.

Scenario 2: Disease Control An outbreak of foot-and-mouth disease hits a cattle farm. Some animals are quarantined, and movement is restricted. Task: Explain the importance of quarantine and vaccination in disease control and discuss the economic effects of livestock epidemics on farmers.

6. Harvesting Farm Animals and Animal Products

Scenario 1: Slaughter Hygiene A butcher slaughters animals under unhygienic conditions near a marketplace. Flies and dirty equipment are observed, and meat inspection is ignored. Task: Discuss the importance of hygiene and inspection in slaughtering and processing animal products. Suggest measures to ensure clean and safe meat production.

Scenario 2: Egg Handling and Preservation A poultry farmer collects eggs daily but stores them in a hot room. After a week, many eggs spoil before reaching the market. Task: Explain the correct methods for collecting, handling, and storing eggs to maintain quality and extend shelf life.